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ABSTRACT

Using interviews with parents and guardians, and the child where appropriate, this study compared feeding problems of children with disabilities in Kentucky with a sample of typical children. Subjects were 50 children ages 3-5; 25 children were without disabilities. In addition to interviews, data were collected from case records, medical histories, and a food frequency questionnaire. A Health and Nutrition Assessment Inventory for children with feeding disorders was done with both groups. Results showed that: (1) children without disabilities were taller and weighed more than children with disabilities; (2) children with disabilities had a greater incidence of poor oral motor skills; (3) children with disabilities have more dental problems and weaker tongue muscles; (4) typical children spend a longer time eating than children with disabiilities. The implications of this study are that children with special needs are at an increased risk for nutritional deficiencies or excesses than typical children and require additional attention from teachers during feeding. Also, children with disabilities may require more careful monitoring of dental health needs, since dental health is directly related to nutritional status. The present study documents the need for an incrasing role of the nutritionist as a vital member of the education team for these children. Since these children are and will continue to be mainstreamed, it is important for educators to understand the feeding problems associated with this population. Contains nine notes and references. (JW)

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Nutritional Intake in Children with Disabilities Compared to Typical Children

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Introduction:

Two reports on 'Nutrition and Health, and on 'Children with Special Health Care Needs' emerging from the Surgeon General's office concluded that there was a need for better nutrition through early intervention, particularly for children with special health care needs. One important piece of legislation related to these children is Public Law (PL) 94-142, *The Education for All Handicapped Children Act.* This law requires states to provide a free appropriate education, including necessary related services, for all school-aged children, regardless of level of disability. The *Education for All Handicapped Children Act* was significantly amended in 1986 (PL 99-457) to include services for very young children, ages zero to two years, with disabilities or substantial developmental delays and their families, and to preschool children ages three through five. This law, now re-authorized as the *Individuals with Disabilities Education Act*, (IDEA), stipulates the delivery of comprehensive related services for children who require these services to benefit from their education (1). Nutrition, as an important facet to health, was included as a related service.

The inclusion of children with disabilities into elementary schools and early childhood programs raises questions about who is to supervi e nutrition and feeding of these children. In Kentucky the preschool program guidelines place responsibility for nutrition with teachers. Programs are required to provide at least one meal daily and integrate developmentally appropriate nutrition into the curriculum (2). Past research established that teachers and child care providers felt they had insufficient knowledge to manage nutritional services for typical children (3,4). In a recent study on nutrition knowledge and attitudes of early childhood teachers of children with disabilities, Forsythe

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and Wesley showed that early childhood teachers perceived a specific need for nutrition knowledge to manage care for children 'at risk'(4). This study also showed that 46% of teachers were unsure about planning nutrition activities. This and other research findings identify a need for greater exposure to available curriculum guides or workshops conducted by qualified dietitians so teachers can develop more individualized guides for children with feeding and nutrition problems (5).

Feeding problems are common in children in the early years. Their likes and dislikes may change daily, they adopt ritualistic eating patterns, have food preferences that often exclude important nutrients and they may have poor appetites (5,6,7). The incidences of oral motor problems (chewing and swallowing) in children with disabilities are greater. They consume more specialized diets that may have modified textures, and often need assistance to eat. Even if the child is self feeding, he or she may take longer to finish a meal. Teachers need the knowledge about how to ensure these children meet their nutritional needs.

A survey of Kentucky teachers showed that 66% of teachers did not monitor the nutritional needs of the children with disabilities, 46% did not include children with disabilities in a meal setting with typical children which is counter to the concept of inclusion. Also 68% of teachers felt nutrition was not their responsibility since children with disabilities had other service providers and they felt few children were undernourished (5).

The purpose of this study was to compare the differences in the feeding problems of children with disabilities with a sample of typical children. The major hypothesis of the study is that there will be no significant differences in feeding skills between children with disabilities and typical children. One specific aim was to document the feeding problems of children with disabilities in Kentucky preschools so as to reiterate the need for special educators and school food service personnel to seek

professional development resources that help them to understand the feeding problems of children with disabilities included in the school system.

Methods

The study included 50 children ages three to five. Twenty-five of the children had disabilities and twenty-five children did not. The study design used equivalent groups. There were twenty-five children without disabilities, pooled from 11,250 children in 84 of 120 counties in Kentucky who were randomly selected to form the control group. These children were evaluated in schools that agreed to participate and after parental approval was obtained. The children with disabilities were randomly selected, after parental approval from children who were screened in the University of Kentucky, Interdisciplinary Human Development Institute, University Affiliated Program (UK-IHDI-UAP). The children presented a range of disabilities including cerebral palsy, autism/pervasive developmental disorder, attention-deficit-hyperactivity disorder among others.

The data were collected by interviews with parents/guardians and the child where appropriate. A Health and Nutrition Assessment Inventory designed by the University of Tennessee UAP for children with feeding disorders was done with both groups. Health data for children with disabilities were supplemented from case records. The assessment included anthropometric and dietary evaluations and a medical history of the child. A food frequency questionnaire was used to collect current food intakes. Income levels, gender, and race of the children in both groups varied and were not considered separately in the analysis.

Data were analyzed using the SAS computer program package and the N-squared Computing

Dietary analysis, Nutritionist IV for windows. The data were analyzed using frequency tables, cross tabulations, chi-square tests, and t-tests and means and standard deviations for nutrients. Analyses of all variables are not reported in this paper. Variables compared in this paper include body composition measurements, oral-motor feeding skills, dental status, and feeding patterns. A limitation of the study is its small sample size, but this was controlled by the number of children with disabilities (134 children) who were available for random selection.

Results and Discussion

It is noted in Table 1 that age for the children with disabilities ranged from three to five with the mean age being 3.68. Age for the typical children ranged from three to five with 3.72 as the mean age. Table 1 shows also height for the children with disabilities ranged from 32 inches to 64 inches, with a mean of 40 inches. Height for the typical children ranged from 34 inches to 70 inches, with the mean at 44.8 inches. Weight for the children with disabilities ranged from 29-53 lbs, with the mean at 39 lbs. Weight for the typical children ranged from 34-74 pounds, with the mean at 47 pounds.

Table 2 showed children with disabilities had a greater incidence of poor oral motor skills compared to typical children. They had more difficulty closing their mouth around a spoon or glass, difficulty swallowing, and difficulty chewing. Often these children have no gag reflex, making aspiration common, and swallowing difficult. Further, weakened oral muscles can make closing their mouths and chewing almost impossible. Many children with these problems are required to have a barium swallow test conducted to correctly prescribe a diet and these diet prescriptions may need to

be followed by school food service personnel and teachers.

With many disabilities, it is also common for the tongue to be increased in size, and the muscle control to be weak. This can contribute to increased drooling and feeding problems as well. Oral motor skills are important to have, and if they are lacking, feeding problems are usually imminent.

Table 3 compares the dental status for children with disabilities compared to typical children. The variable, missing teeth is significant at p=.018 in the children with disabilities group. It is common for this population to have "tough" gums where teeth have may a difficult time breaking the surface, or the teeth may have never been formed.

Intolerance to tooth brushing is also statistically significant at p=.004 for children with disabilities compared to typical children. This may be explained by hypersensitivity to a stimulus (or a symptom called "Tactile Defensiveness"), which is a defensive reaction due to the sensitivity of being touched. This is common in children with a variety of disabilities.

Overgrowth of gum tissue can be caused by certain drugs. This was significant at p=.037. The assessment of dental status is important in conjunction with feeding problems. If teeth are out of place, or there is dental decay due to the child not brushing his or her teeth, or if gums are tender, then the child may avoid eating. This condition may also cause the child not to like certain textures, or make eating painful. Children with disabilities who experience dental problems can have poor nutritional status.

Table 4, which presents current dietary situations of both groups, shows significant values for seven variables. Using a bottle, pureed, or baby food is significant at p=.002 for children with disabilities; consuming mechanically soft/chopped, or junior baby food is significant for children with disabilities at p=.018; having a special or modified diet is significant for children with disabilities at

$p<.0001$; and being fed through a tube feeding is significant for children with disabilities at $p=.002$. These findings are common, because children with disabilities have to alter their methods of intake to meet dietary needs. Some children may still use a bottle at two to three years old, because using a cup or open-top container is hard to handle. They also may have oral motor problems, like the examples previously mentioned, which may cause food not to stay inside their mouths. Mechanically soft or chopped foods aid children with disabilities in chewing and swallowing, because oral motor control may be lacking. Special or modified diets are needed to accommodate precise dietary needs relating to chronic diseases in children with disabilities. Ingesting medications that may alter nutrient absorption can also cause a child to be on a special diet. Tube feeding is more frequent in children with disabilities, especially through a gastrostomy. This nutrition support is needed for children who lack oral motor skills; have malabsorption problems; or have severe physical incapabilities.

Table 4 illustrates that children with disabilities tend to have an increased incidence of being fed most or all of their meal by another person. Again, this is common with this population since body muscle control can be limited along with fine motor skills. Poor motor control can make the use of eating utensils almost impossible; the result is also explained by the large number of children who required tube feeding in the sample.

Discussion

The above findings were expected. Children with disabilities have several barriers to nutritional intake. This often requires alterations in methods of intake to meet dietary needs. It was important to do the study to document the feeding problems that exist for children with disabilities

who are included in preschool, early start and head start programs. Some children may still use a bottle at two-three years old, because using a cup or open-top container is hard to handle. Oral motor problems that delay development of good chewing and swallowing skills make it difficult for a child with the disability to hold food inside their mouths long enough to eat it. Mechanically soft or chopped foods aid children with disabilities in chewing and swallowing, when oral motor control is lacking. Special or modified diets are needed for children with disabilities, because they may have diseases like diabetes or cystic fibrosis, which require precise diets. Ingesting medications that alter nutrient absorption can also cause a child to need a special diet. Tube feeding, through a gastrostomy, is common for children who aspirate food into their lungs while eating and are at risk for aspiration pneumonia. Thus, nutrition support is needed for children who lack oral motor skills, have malabsorption problems, or suffer from severe physical incapabilities. In the variable that describes the time spent on eating, typical children were more likely to spend a longer time eating than kids with disabilities. The reasoning for this finding lies with the fact that when feeding is done via a tube or by another person it tends to be much quicker than self feeding. Therefore slow eating defined as greater than 20 minutes for a normal sized meal would be readily observed among typical children.

Implications

The results of this study showed, that compared to typical children, those with disabilities had more dental problems, more oral motor problems, and received and consumed more specialized diets. The implication is that children with special needs are at an increased risk for nutritional deficiencies

or excesses than typical children and require additional attention from teachers during feeding. Moreover, children with disabilities may require more careful monitoring of dental health needs, since dental health is directly related to nutritional status. If left unattended, dental needs may compromise a child's readiness to learn, as well as their general health status.

As schools move toward greater inclusion of children with disabilities into regular education classes and programs, training for educational personnel becomes increasingly important. It is essential for educators who will be responsible for the food intake of these children to understand the feeding problems that can occur. Special education teachers who will be providing support to children in regular classes most clearly require a strong knowledge base, but all educators should have some exposure to the feeding and nutritional needs of children with disabilities as a part of their professional development. Indeed, recent surveys in Kentucky and Pennsylvania (8,9) indicate the critical training needs of regular educators, in general, if children with disabilities are to be more fully included; and that regular educators rarely rate their pre-service programs as giving them the requisite skills for addressing this population.

These findings also have direct relevance for nutritionists working in both early childhood and public school settings. Indeed, much of what nutritionists may be called to do in serving the needs of these children in educational settings will be to provide training and consultant services to both regular and special educators, to classroom support staff such as paraprofessionals, and to families, in meeting the nutritional needs of children with disabilities. The present study documents the need for an increasing role of the nutritionist as a vital member of the educational team for these children.

Conclusion

The results showed that in this study, children with disabilities had more problems associated with dietary intake compared to typical children. Since these children are and will continue to be main streamed, it is important for educators working with these children to understand the feeding problems that can be present in this population. In order to comply with PL 94-142 and the Americans With Disabilities Act, educators may need to include the feeding of children with disabilities and nutrition education into their curriculum.

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Table 1. Age, Weight, and Height of Children with Disabilities and Typical Children

Variable Mean	Children with Disabilities	Typical Children
Age in Years	3.68	3.72
Height (inches)	40	44.8
Weight (lbs)	39	47

Table 2. Oral Motor Skills of Children with Disabilities and Typical Children

Variable	Children with disabilities		Typical Children	
	Yes %	No %	Yes %	No %
Diff. closing mouth around a spoon or glass*	28	72	0	100
Diff. swallowing *	28	72	0	100
Diff. chewing*	24	76	0	100
Diff. keeping tongue in mouth	24	76	0	100
Drools *	10	40	4	96

Statistically significant at 0.05

Table 3. Dental Status of Children with Disabilities and Typical Children

Variable	Children with disabilities		Typical Children	
	Yes %	No %	Yes %	No %
Dental Decay	12	88	0	100
Missing teeth (unusual) *	20	80	0	100
Overgrowth of Gum Tissue *	16	84	0	100
Poor occlusion	12	88	0	100
Teeth improperly formed	28	72	8	92
Diff. tolerating brushing *	24	76	4	96

Statistically significant at 0.05

Table 4. Current Dietary Situation of Children with disabilities and Typical Children

Variable	Children with disabilities		Typical children		P Value
	Yes %	No %	Yes %	No %	< 0.05
Bottled, pureed or baby foods	36	64	0	100	.002
Mechanical, soft or junior foods	20	80	0	100	.018
Special or modified diet	48	52	0	100	.0001
Tube feeding	32	68	0	100	.002
Vitamin/mineral supplement	40	60	52	48	-
Feeding problems (general)	16	84	4	96	-
Fed most/all of meal by another person	36	64	4	96	.05
Appetite varies markedly	20	80	52	48	-
Takes >20 min. <10 min. to eat	36	64	52	48	-
Difficulty eating solids	56	44	4	96	.05
Bizarre food habits	12	88	0	100	-